

## Claims

1. A supported catalyst comprising a support (S) in which Al<sub>2</sub>O<sub>3</sub> is present in a proportion of at least 75% by weight and rhenium compounds as active component (A), wherein the maximum of the distribution function of the pore diameters in the mesopore range is from 0.008 to 0.050 µm.  
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2. The supported catalyst according to claim 1, wherein the support (S) comprises Al<sub>2</sub>O<sub>3</sub> together with compounds selected from the group consisting of SiO<sub>2</sub>, aluminosilicates, TiO<sub>2</sub>, ZrO<sub>2</sub>, MgO, CeO<sub>2</sub> and ZnO.  
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3. The supported catalyst according to claim 1 or 2, wherein the active component (A) comprises rhenium oxide together with a promoter selected from the group consisting of phosphorus oxide, Fe<sub>2</sub>O<sub>3</sub>, tantalum oxide, ZrO<sub>2</sub>, SiO<sub>2</sub>, niobium oxide, oxides of the elements of the lanthanide series, vanadium oxide, molybdenum, tungsten, alkali metal, alkaline earth metal and tin compounds.  
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4. The supported catalyst according to any of claims 1 to 3, wherein the amount of rhenium compound is selected so that the supported catalyst comprises from 0.01 to 1 mmol of rhenium per gram of supported catalyst.  
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5. A process for producing a supported catalyst according to any of claims 1 to 4, which comprises  
25     a1) in step (a1), producing a raw mixture (a) comprising the support (S) onto which the active component (A) may have been applied if appropriate, a pore-forming material (P), if appropriate customary auxiliaries and if appropriate a customary active component,  
30     b1) in step (b1), forming shaped bodies as are customary for supported catalysts from the raw mixture (a) and, either simultaneously or in a subsequent separate procedure, removing the pore-forming material (P) by heating,  
35     c1) in step (c1), if appropriate applying the active component (A) to the shaped bodies, with the step (c1) being obligatory if the production of the raw mixture (a) in step (a1) has been carried out without using the active component (A) or a support (S) to which an active component (A) has already been applied and otherwise being optional.  
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6. The process according to claim 5, wherein the pore-forming material (P) is selected from the group consisting of tartaric acid, oxalic acid, citric acid, ammonium nitrate, ammonium oxalate, guanidinium salts, urotropin, proteins such as

gelatin, carbohydrates such as glucose, sucrose and soluble starch, poly-tetrahydrofuran, surfactants, sulfonic acids, polyvinyl alcohol, methylcellulose, polyalcohols, lactic acid, polyethylene oxides, polymethylene oxides, polypropylene oxides, polyolefins, nut shell powders, polyacrylates, carbonates, hydrogen-carbonates, fats, waxes, fatty acids, alginates, textile fibers, plant fibers and oxalates.

- 5      7. The process according to claim 5 or 6, wherein the raw mixture (a) is prepared as a powdered mixture and the shaped bodies are produced by pressing the powder mixture.
- 10     8. The process according to any of claims 5 to 7, wherein the raw mixture (a) is prepared as an extrudable suspension in which the support (S) and the pore former (P) form a discontinuous phase and a customary suspension medium forms the continuous phase and the active component (A), if present, is dissolved or suspended in the continuous phase.
- 15     9. The process according to any of claims 5 to 8, wherein the raw mixture (a) prepared as an extrudable suspension in step (a) is converted in step (b) into a moldable supported catalyst precursor by shaping the extrudable suspension to form shaped bodies as are customary for supported catalysts and subsequently curing the shaped bodies by evaporating the suspension medium.
- 20     10. A process for producing the supported catalyst according to any of claims 1 to 4, which comprises producing the supported catalyst by customary methods from a support (S) having a maximum of the distribution function of the pore diameters in the mesopore range at from 0.008 to 0.050 µm and an active component (A) using customary auxiliaries if appropriate.
- 25     11. The process according to claim 10, wherein the support (S) having a maximum of the distribution function of the pore diameters in the mesopore range at from 0.008 to 0.050 µm is produced by aging an aluminum alkoxide at a water vapor pressure of from 1 to 30 bar and a temperature of from 100 to 235°C for from 0.5 to 20 hours while stirring at a circumferential velocity of from 1.0 to 6.0 m/s and drying and if appropriate shaping the resulting synthetic aluminum hydroxide by a customary method.
- 30     12. The process according to claim 11, wherein supports (S) having a maximum of the distribution function of the pore diameters in the mesopore range at from 0.008 to 0.050 µm are produced by
  - preparing an alumina sol from a synthetic aluminum hydroxide prepared according to claim 11 by suspending the alumina hydrate in dilute mineral
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acid having a concentration of from 1 to 5% and subsequently adding from 1 to 10% by weight, based on the total weight of the sol, of urea,

- introducing the alumina sol dropwise into a shaping column whose lower part is filled with aqueous ammonia solution, and
  - drying the spherical particles formed in the shaping column.
- 5        13. A process for producing the supported catalyst according to any of claims 1 to 7, which comprises
- 10      a2) in step (a2), preparing a suspension which can be processed in a pan mill and in which a customary suspension medium forms the continuous phase and a support (S) having a maximum of the distribution function of the pore diameters in the mesopore range at from 0.002 to 0.008 µm is present in the discontinuous phase and, if appropriate, the active component (A) and customary auxiliaries are dissolved or suspended in the continuous phase,
- 15      b2) in step (b2), treating this suspension in a pan mill until the fine surface structure of the support (S) suspended therein has been altered to such an extent that shaped bodies produced from the suspension have, after drying, a maximum of the distribution function of the pore diameters in the mesopore range at from 0.008 to 0.050 µm.
- 20      25     14. A process for preparing a compound having a nonaromatic C-C double bond or C-C triple bond (compound A) from another compound or mixture of other compounds having a nonaromatic C-C double bond or C-C triple bond (compound B), which comprises bringing the compound (B) into contact with a supported catalyst according to any of claims 1 to 7 at a temperature of from 50 to 500°C.
- 30      15. The process according to claim 17, wherein compound (B) is 1-butene or a mixture of butenes comprising 1-butene.